



Graves disease

Graves disease is a condition that affects the function of the thyroid, which is a butterfly-shaped gland in the lower neck. The thyroid makes hormones that help regulate a wide variety of critical body functions. For example, thyroid hormones influence growth and development, body temperature, heart rate, menstrual cycles, and weight. In people with Graves disease, the thyroid is overactive and makes more hormones than the body needs. The condition usually appears in mid-adulthood, although it may occur at any age.

Excess thyroid hormones can cause a variety of signs and symptoms. These include nervousness or anxiety, extreme tiredness (fatigue), a rapid and irregular heartbeat, hand tremors, frequent bowel movements or diarrhea, increased sweating and difficulty tolerating hot conditions, trouble sleeping, and weight loss in spite of an increased appetite. Affected women may have menstrual irregularities, such as an unusually light menstrual flow and infrequent periods. Some people with Graves disease develop an enlargement of the thyroid called a goiter. Depending on its size, the enlarged thyroid can cause the neck to look swollen and may interfere with breathing and swallowing.

Between 25 and 50 percent of people with Graves disease have eye abnormalities, which are known as Graves ophthalmopathy. These eye problems can include swelling and inflammation, redness, dryness, puffy eyelids, and a gritty sensation like having sand or dirt in the eyes. Some people develop bulging of the eyes caused by inflammation of tissues behind the eyeball and "pulling back" (retraction) of the eyelids. Rarely, affected individuals have more serious eye problems, such as pain, double vision, and pinching (compression) of the optic nerve connecting the eye and the brain, which can cause vision loss.

A small percentage of people with Graves disease develop a skin abnormality called pretibial myxedema or Graves dermopathy. This abnormality causes the skin on the front of the lower legs and the tops of the feet to become thick, lumpy, and red. It is not usually painful.

Frequency

Graves disease affects about 1 in 200 people. The disease occurs more often in women than in men, which may be related to hormonal factors. Graves disease is the most common cause of thyroid overactivity (hyperthyroidism) in the United States.

Genetic Changes

Graves disease is thought to result from a combination of genetic and environmental factors. Some of these factors have been identified, but many remain unknown.

Graves disease is classified as an autoimmune disorder, one of a large group of conditions that occur when the immune system attacks the body's own tissues and organs. In people with Graves disease, the immune system creates a protein (antibody) called thyroid-stimulating immunoglobulin (TSI). TSI signals the thyroid to increase its production of hormones abnormally. The resulting overactivity of the thyroid causes many of the signs and symptoms of Graves disease. Studies suggest that immune system abnormalities also underlie Graves ophthalmopathy and pretibial myxedema.

People with Graves disease have an increased risk of developing other autoimmune disorders, including rheumatoid arthritis, pernicious anemia, systemic lupus erythematosus, Addison disease, celiac disease, type 1 diabetes, and vitiligo.

Variations in many genes have been studied as possible risk factors for Graves disease. Some of these genes are part of a family called the human leukocyte antigen (HLA) complex. The HLA complex helps the immune system distinguish the body's own proteins from proteins made by foreign invaders (such as viruses and bacteria). Other genes that have been associated with Graves disease help regulate the immune system or are involved in normal thyroid function. Most of the genetic variations that have been discovered are thought to have a small impact on a person's overall risk of developing this condition.

Other, nongenetic factors are also believed to play a role in Graves disease. These factors may trigger the condition in people who are at risk, although the mechanism is unclear. Potential triggers include changes in sex hormones (particularly in women), viral or bacterial infections, certain medications, and having too much or too little iodine (a substance critical for thyroid hormone production). Smoking increases the risk of eye problems and is associated with more severe eye abnormalities in people with Graves disease.

Inheritance Pattern

The inheritance pattern of Graves disease is unclear because many genetic and environmental factors appear to be involved. However, the condition can cluster in families, and having a close relative with Graves disease or another autoimmune disorder likely increases a person's risk of developing the condition.

Other Names for This Condition

- autoimmune hyperthyroidism
- Basedow disease
- Basedow's disease
- exophthalmic goiter
- Graves' disease
- toxic diffuse goiter

Diagnosis & Management

These resources address the diagnosis or management of Graves disease:

- American Thyroid Association: Thyroid Function Tests
<https://www.thyroid.org/thyroid-function-tests/>
- Genetic Testing Registry: Graves disease 2
<https://www.ncbi.nlm.nih.gov/gtr/conditions/C1863923/>
- Genetic Testing Registry: Graves disease 3
<https://www.ncbi.nlm.nih.gov/gtr/conditions/C1841794/>
- Genetic Testing Registry: Graves disease, susceptibility to, X-linked 1
<https://www.ncbi.nlm.nih.gov/gtr/conditions/C2678151/>
- Genetic Testing Registry: Graves' disease
<https://www.ncbi.nlm.nih.gov/gtr/conditions/C0018213/>
- Graves' Disease & Thyroid Foundation: Treatment Options
<http://www.gdatf.org/about/about-graves-disease/treatment-options/>
- MedlinePlus Encyclopedia: TSI
<https://medlineplus.gov/ency/article/003685.htm>
- National Institute of Diabetes and Digestive and Kidney Diseases: Thyroid Function Tests
<https://www.niddk.nih.gov/health-information/health-topics/diagnostic-tests/thyroid-tests/Pages/default.aspx>
- Thyroid Disease Manager: Diagnosis and Treatment of Graves Disease
<http://www.thyroidmanager.org/chapter/diagnosis-and-treatment-of-graves-disease/>

These resources from MedlinePlus offer information about the diagnosis and management of various health conditions:

- Diagnostic Tests
<https://medlineplus.gov/diagnostictests.html>
- Drug Therapy
<https://medlineplus.gov/drugtherapy.html>
- Surgery and Rehabilitation
<https://medlineplus.gov/surgeryandrehabilitation.html>
- Genetic Counseling
<https://medlineplus.gov/geneticcounseling.html>
- Palliative Care
<https://medlineplus.gov/palliativecare.html>

Additional Information & Resources

MedlinePlus

- Encyclopedia: Goiter - Simple
<https://medlineplus.gov/ency/article/001178.htm>
- Encyclopedia: Graves Disease
<https://medlineplus.gov/ency/article/000358.htm>
- Encyclopedia: Graves Disease (image)
<https://medlineplus.gov/ency/imagepages/17067.htm>
- Encyclopedia: TSI
<https://medlineplus.gov/ency/article/003685.htm>
- Health Topic: Hyperthyroidism
<https://medlineplus.gov/hyperthyroidism.html>

Genetic and Rare Diseases Information Center

- Graves' disease
<https://rarediseases.info.nih.gov/diseases/6549/graves-disease>

Additional NIH Resources

- National Institute of Diabetes and Digestive and Kidney Diseases
<https://www.niddk.nih.gov/health-information/health-topics/endocrine/graves-disease/Pages/fact-sheet.aspx>

Educational Resources

- Disease InfoSearch: Graves' Disease
<http://www.diseaseinfosearch.org/Graves%27+Disease/3178>
- Hormone Health Network: Goiter
<http://www.hormone.org/questions-and-answers/2013/goiter>
- Hormone Health Network: Graves Disease
<http://www.hormone.org/questions-and-answers/2012/graves-disease>
- MalaCards: graves' disease
http://www.malacards.org/card/graves_disease
- Merck Manual Home Health Handbook: Hyperthyroidism
<http://www.merckmanuals.com/home/hormonal-and-metabolic-disorders/thyroid-gland-disorders/hyperthyroidism>
- Office on Women's Health, U.S. Department of Health and Human Services
<https://www.womenshealth.gov/publications/our-publications/fact-sheet/graves-disease.html>

Patient Support and Advocacy Resources

- American Thyroid Association
<http://www.thyroid.org/category/what-is-graves-disease/?audi=45>
- Graves' Disease & Thyroid Foundation
<http://www.gdatf.org/>
- National Organization for Rare Disorders (NORD)
<https://rarediseases.org/rare-diseases/graves-disease/>
- Thyroid Foundation of Canada
http://www.thyroid.ca/thyroid_disease.php

Genetic Testing Registry

- Graves disease 2
<https://www.ncbi.nlm.nih.gov/gtr/conditions/C1863923/>
- Graves disease 3
<https://www.ncbi.nlm.nih.gov/gtr/conditions/C1841794/>
- Graves disease, susceptibility to, X-linked 1
<https://www.ncbi.nlm.nih.gov/gtr/conditions/C2678151/>
- Graves' disease
<https://www.ncbi.nlm.nih.gov/gtr/conditions/C0018213/>

ClinicalTrials.gov

- ClinicalTrials.gov
<https://clinicaltrials.gov/ct2/results?cond=%22Graves+disease%22>

Scientific Articles on PubMed

- PubMed
<https://www.ncbi.nlm.nih.gov/pubmed?term=%28Graves+Disease%5BMAJR%5D%29+AND+%28Graves+disease%5BTI%5D%29+AND+english%5Bla%5D+AND+human%5Bmh%5D+AND+%22last+360+days%22%5Bdp%5D>

OMIM

- GRAVES DISEASE, SUSCEPTIBILITY TO, 1
<http://omim.org/entry/275000>
- GRAVES DISEASE, SUSCEPTIBILITY TO, 2
<http://omim.org/entry/603388>
- GRAVES DISEASE, SUSCEPTIBILITY TO, X-LINKED 1
<http://omim.org/entry/300351>

Sources for This Summary

- Eschler DC, Hasham A, Tomer Y. Cutting edge: the etiology of autoimmune thyroid diseases. Clin Rev Allergy Immunol. 2011 Oct;41(2):190-7. doi: 10.1007/s12016-010-8245-8. Review.
Citation on PubMed: <https://www.ncbi.nlm.nih.gov/pubmed/21234711>
Free article on PubMed Central: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3129418/>
- Hasham A, Tomer Y. Genetic and epigenetic mechanisms in thyroid autoimmunity. Immunol Res. 2012 Dec;54(1-3):204-13. doi: 10.1007/s12026-012-8302-x. Review.
Citation on PubMed: <https://www.ncbi.nlm.nih.gov/pubmed/22457094>
Free article on PubMed Central: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3601048/>
- Jacobson EM, Huber A, Tomer Y. The HLA gene complex in thyroid autoimmunity: from epidemiology to etiology. J Autoimmun. 2008 Feb-Mar;30(1-2):58-62. doi: 10.1016/j.jaut.2007.11.010. Epub 2008 Jan 4. Review.
Citation on PubMed: <https://www.ncbi.nlm.nih.gov/pubmed/18178059>
Free article on PubMed Central: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2244911/>
- National Institute of Diabetes and Digestive and Kidney Diseases
<https://www.niddk.nih.gov/health-information/health-topics/endocrine/graves-disease/Pages/fact-sheet.aspx>
- Simmonds MJ, Gough SC. The search for the genetic contribution to autoimmune thyroid disease: the never ending story? Brief Funct Genomics. 2011 Mar;10(2):77-90. doi: 10.1093/bfpg/elq036. Review.
Citation on PubMed: <https://www.ncbi.nlm.nih.gov/pubmed/21436304>
- Tomer Y. Genetic susceptibility to autoimmune thyroid disease: past, present, and future. Thyroid. 2010 Jul;20(7):715-25. doi: 10.1089/thy.2010.1644. Review.
Citation on PubMed: <https://www.ncbi.nlm.nih.gov/pubmed/20604685>
Free article on PubMed Central: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2949235/>

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<https://ghr.nlm.nih.gov/condition/graves-disease>

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